Citation:

Viner RM, Cole TJ. Television viewing in early childhood predicts adult body mass index. J Pediatr. 2005 Oct;147(4):429-35.

PubMed ID: 16227025

Study Design:

Prospective Cohort

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine the effects of duration, timing, and type of television (TV) viewing at age 5 years on body mass index (BMI) in adult life

Inclusion Criteria:

This study used the sample in the 1970 British Cohort Study.

- Living in Great Britain and who were born in the week of April 5-11, 1970 (16,567 babies born in England, Scotland, and Wales were enrolled)
- Subjects were followed up at 5, 10, 16, 26, and 29-30 years of age; this study required the 5 and 10, and 29-30 years of age data (n=11,261)

Exclusion Criteria:

None Applicable

Description of Study Protocol:

Recruitment

Not described in detail. Babies and their parents were recruited at the birth of the baby in Great Britain in April 1970. At 10 years of age (1980), cohort members were traced and invited to participate in more data collection. In 2000, when subjects were 29-30 years of age, cohort members were traced and invited to participate again (11,261 (68%) underwent interview). Efforts were made to recruit difficult-to-reach subjects; efforts were unspecified, but losses from lower social classes between the birth and 30-year surveys were minor.

Design

Prospective cohort; data were obtained electronically from the UK Data Archive, University of Essex, UK, and SPSS code for cleaning the databases and deriving summary variables were obtained from the Centre for Longitudinal Studies, Institute of Education, London

Blinding used (if applicable)

Anonymous data was used

Intervention (if applicable)

NA

Statistical Analysis

Linear regression was used to estimate the associations of TV watching habits at 5 and 10 years with BMI z-score firstly at 10 years and then at 30 years. Associations were first examined for each factor adjusted for sex, social class, maternal educational achievement, birth weight, and BMI z-score of both parents. Associations were adjusted for height at 5 and 10 years as well, because BMI z-score is not entirely independent of height.

Multivariate regression models were derived adjusting for all other factors including sex, social class, and height. Further adjustments at 30 years for BMI z-score at 10 years were also made, because childhood obesity may be on a causal pathway between early childhood TV and adult BMI.

SPSS and Stata 8 were used.

Data Collection Summary:

Timing of Measurements

At birth:

- Birth weight

At 5 years:

- Mothers provided data on the average number of hours per day that their child watched TV during the week (Mon-Fri) and weekends (Sat and Sun)
- Parents reported the average number of days per week that their child watched TV after 6pm during the week and weekend, and the type of TV programs they usually watched (children's programs, cartoons, or adult programming)
- Mothers were asked about beliefs of children and TV (43 items on a 5-point Likert scale)
- Child's height measured
- Socioeconomic status in childhood, as defined by social class (paternal occupation) and maternal education

At 10 years:

- Mothers rated their child's usual frequency of watching TV categorically (Rarely or never, Sometimes, or Often)
- Parents reported frequency that their child played sport in their spare time (Rarely, Sometimes, or Often)

- Child height and weight measured (measured)
- Parents' heights and weights (measured and self-report)

At 30 years:

- Participant's (grown child) height and weight (self-report) to calculate BMI z-scores for each sex from cohort internal mean and standard deviation
- Social class

Dependent Variables

- Child BMI z-scores

Independent Variables

- Mother's beliefs --- The mother's beliefs about children and TV underwent factor analysis and 4 questions made up a separate dimension indicating beliefs regarding the effects of TV on young children; weighted scores for this dimension converted to a z-score in which a higher scored indicated stronger maternal beliefs that TV was harmful for young children
- TV watching during the week, weekends, and after 6pm

Control Variables

- Sex of child
- Social class
- Maternal educational achievement
- Birth weight
- BMI z-score of both parents
- Height at 5 and 10 years

Description of Actual Data Sample:

Initial N: 16,567 (enrolled at birth)

Attrition (final N):

- At 10 years (1980) - 15,995 were traced and data were obtained on 14,875
- At 29-30 years (2000) - 14,087 were traced and 11,261 (68%) underwent interview
- Data on TV viewing in childhood and BMI at 10 and 30 years was available in 8,158 subjects (68% of cohort at 30 years); this is the group represented in this study

Age: Followed from birth to 29-30 years

Ethnicity: At 30 years of age, 96.3% identified as white, 0.6% black, 1.8% from South Asia, 0.8% Chinese or other Asian, and 0.6% mixed ethnicity.

Other relevant demographics: NA

Anthropometrics Reported in the results

Location: Great Britain

Summary of Results:

Key Findings:

- Mean hours of TV viewing at 5 years was 1.42(1.30 SD) on weekdays and 1.57(1.54 SD) on weekends.
- Obesity was found in 4.3% at 10 years and 11.4% at 30 years.
- Higher duration of TV watching during weekdays and at weekends were both significantly associated with higher BMI z-scores at 10 and 30 years.
- Higher frequency of viewing during weekdays and weekends at 5 years both predicted higher frequency of viewing at 10 years (p<.0001), but frequency of TV viewing at 10 years did not independently predict adult BMI.
- Stronger maternal beliefs that TV was harmful to children at 5 years predicted lower freqeuency of viewing at 10 years (P<.0001), but maternal attitudes toward TV at 10 years were not independently predictive of adult BMI.
- Each additional hour of TV watched on weekdays at 5 years increased risk of obesity by 12% (OR = 1.12, 95% CI: 1.04,1.21; P=.002). Each additional hour of TV watched on weekends increased risk of obesity by 10% (OR = 1.10, 95% CI: 1.03,1.18; P=.003).
- With obesity at age 30 as the outcome, each additional hour of TV watched on weekeends at 5 years increased risk of obesity by 7% (OR = 1.07, 95% CI 1.01, 1.13; P=.02) when adjusted for by covariates.

Variables	Category	%	Statistical Significance of Group Difference
5 years - TV viewing weekdays	Hours per day	59% <2 hours	NA
		35% 2-3.9 hours	
	Days watched after 6pm	6% at least 4 hours	
		60% no days; 11% 1 day;5%, 3%, 4%, and 18% for 2, 3, 4, and 5 days respectively	
5 years - TV viewing weekend	Hours per day	58% <2 hours	
		32% 2-3.9 hours	
	Days watched after 6pm	10% at least 4 hours	
		64% neither; 19% one day; 17% 2 days	
5 years - programs viewed	Children's programs (no cartoons)	94% yes	
		93% yes	
	Cartoons	83% yes	
	Adult programming		

10 years - TV viewing habit	Frequency (categorical)	1% Rarely or never; 20% Sometimes, 79% Often

Other Findings

- Bivariate associations: Mean hours of TV watched on the weekend and frequent TV watching at 10 years were independently associated with higher BMI z-score at 10 years
- Regression: Maternal belief that TV was harmful to young children at 5 years and higher frequency of playing sport at 10 years were independently associated with lower BMI z-score.

Author Conclusion:

Weekend TV viewing in early childhood continues to influence BMI in adulthood. Interventions of obesity by reducing sedentary behaviors must begin in early childhood. Interventions focusing on weekend TV viewing may be particularly effective.

Reviewer Comments:

Strengths:

- *Longitudinal data from a large representative national birth cohort*
- *Cohort provided detailed data on frequency and timing of TV watching, type of programs, and maternal attitudes toward TV in early childhood.*
- *Controls for analyses*

Weaknesses:

- *Use of self-reported height and weight data in adulthood*
- *Response rate*
- *Semiqualitative data on TV watching and sport at 10 years*
- *Lack of comparability between data on TV viewing and 5 and 10 years*
- *Minor loss to follow-up of heavier TV viewers between 5 and 30 years*
- *Observational; no causality*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes

3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	N/A
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	N/A
2.3.	Were health, demographics, and other characteristics of subjects described?	No
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	N/A
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A

3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	No
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	N/A
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	No
6.6.	Were extra or unplanned treatments described?	No

6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	N/A
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	No
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes

10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes